

REMARKS

In response to the Office Action mailed August 28, 2003, the Applicant respectfully requests reconsideration. Each of the objections set forth in the Office Action is addressed below. The application is believed to be in condition for allowance.

Claims 1-30 were previously pending in this application. Claims 1-15 are allowed. The Office Action objected to claims 17-19, but indicated that they would be allowable if written in independent form. The Office Action rejected claim 16 under 35 U.S.C. §102(b) as anticipated by Fitzgerald (5,787,485), and claims 20-30 under 35 U.S.C. §103(a) as obvious over McBrearty. Applicant respectfully traverses these rejections.

Rejections Under 35 U.S.C. §102

The Office Action rejected claim 16 under 35 U.S.C. §102(b) as anticipated by Fitzgerald. Claim 16 has been amended to clarify the manner in which it distinguishes over Fitzgerald.

Fitzgerald is directed to producing a mirrored copy using reference labels. Fitzgerald discloses a mirror set 100, shown in Figure 1, that includes a first disk 10 and a second disk 20 (col. 2, lines 63-64). One of the disks is designated as the master disk and serves as a primary storage device, while the other disk is designated as the slave disk and serves as a redundant backup (col. 2, line 65-col. 3, line 1). Each of the disks has a separate controller associated with it for controlling the reading and writing of data to the respective disk (col. 3, lines 6-9). If one of the disks (e.g., the slave disk) is unable to process data for some period of time, it may contain divergent data from the other disk (e.g., the master disk) (col. 3, lines 27-29). In this case, mirror set 100 performs a mirror set copy of the data from the updated disk (e.g., the master disk) to the divergent disk (e.g., the slave disk) (col. 3, lines 39-42). The mirror set copy includes the exchange of a number of mirror read and mirror write requests between the two disk controllers (col. 3, lines 45-63). During a mirror set copy operation, only the disk controller of the updated disk (e.g., the master disk controller) processes read requests, while both disk controllers process write requests. (col. 3, lines 45-49 and col. 3, line 64-col. 4, line 5).

Claim 16 is directed to a host computer comprising: a processing unit; and a memory interface module to permit accesses by the host computer to a logical entity to be made to a

first physical storage location for read requests and to a second physical storage location for write requests, to prevent accesses by the host computer to the logical entity from being made to the second physical storage location for the read requests, and to prevent accesses by the host computer to the logical entity from being made to the first physical storage location for write requests, wherein the first and second physical storage locations are different.

Fitzgerald fails to disclose or suggest a memory interface module to permit accesses by the host computer to a logical entity to be made to a first physical storage location for read requests and to a second physical storage location for write requests, to prevent accesses by the host computer to the logical entity from being made to the second physical storage location for the read requests, and to prevent accesses by the host computer to the logical entity from being made to the first physical storage location for write requests, wherein the first and second physical storage locations are different, as recited in claim 1.

Fitzgerald discloses that, during normal operation, both disk controllers can process both read and write requests. Thus, when in normal operation, the system of Fitzgerald does not have any structure that performs the functions of the memory interface module recited in claim 1.

When a mirror set copy is taking place, both disk controllers process write requests, but only one disk controller, i.e., the one associated with the updated disk (e.g., the master controller) can process read requests. This does not disclose a memory interface module as recited in claim 1 that permits read accesses at a physical location but prevents write accesses at that location, as both disk controllers process write requests. Thus, in all modes of operation of Fitzgerald, there is always at least one disk controller that allows both read and write accesses to its associated disk.

As seen from the foregoing, claim 16 patentably distinguishes over Fitzgerald. Accordingly, it is respectfully requested that the rejection of claim 16 under 35 U.S.C. §102(b) be withdrawn. Claims 17-19 depend from claim 16 and are patentable for at least the same reasons.

Rejections Under 35 U.S.C. §103

The Office Action rejected claims 20-30 under 35 U.S.C. §103(a) as being obvious over McBrearty. Applicant respectfully traverses this rejection.

Claim 20

Claim 20 is directed to a storage management controller for a computer storage system that includes a plurality of storage elements. The storage management controller comprises: an interface module to communicate with the storage elements; and an entity movement manager to control separate moving of a read location and a write location for a specified logical entity.

At page 3, paragraph 5, the Office Action asserts that McBrearty discloses that “during the read operation, write operations are being mirrored to a second or third mirror backup storage element. Those write block operations are marked stale, during the copying of the read operations.” Applicant respectfully disagrees.

Nowhere does McBrearty discuss write operations being performed on a mirrored copy during read operations. Further, the assertion that write operations are marked stale during copying of a read operation is unclear and unsupported by the reference. Although McBrearty discloses marking a particular block on the backup mirror stale if the block is updated on another mirror (McBrearty, col. 2, lines 61-62 and col. 6, lines 39-40), it is unclear what the Office Action means by marking write operations as stale “during copying of a read operations,” as McBrearty does not discuss copying of read operations. If the rejection is to be maintained, Applicant respectfully requests that the Examiner specifically cite the portions of McBrearty which are believed to disclose that: (1) “during a read operation, write operations are being mirrored to a second or third mirror backup storage element” and (2) “write block operations are marked stale during copying of the read operations.”

The Office Action further asserts that “it would have been obvious that McBrearty teaches that updated write operations are separately moved to the mirror backup storage.” This assertion is unclear. Specifically, it is not clear whether the Office Action asserts that controlling separate moving of a read location and a write location is inherent in McBrearty, or whether the Office Action is asserting that some well-known art exists that would have motivated one of skill in the art to modify McBrearty to control separate moving of a read location and a write location.

Applicant respectfully requests clarification. In addition, the rejection is believed to be improper under either interpretation.

1. An Entity Movement Manager To Control Separate Moving Of A Read Location And A Write Location Is Not Inherently Disclosed In McBrearty

Initially, Applicant notes that if the Office Action is asserting that the separate moving of read locations and write locations is believed to be inherently disclosed in McBrearty, then it is asserting that all limitations of Applicant's claims are (either explicitly or inherently) disclosed by McBrearty, such that the claims should be rejected under 35 U.S.C. §102, rather than §103.

Establishing inherency requires meeting a heavy burden. As stated in MPEP §2112, the fact that a certain result or characteristic may occur or be present in the reference is not sufficient to establish inherency of that result or characteristic. To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is **necessarily** present in the disclosure provided in the reference, and that it would be so recognized by persons of ordinary skill in the art.

The method of accessing data on one of a plurality of mirrors disclosed by McBrearty does not necessarily disclose or require an entity movement manager to control separate moving of a read location and a write location for a specified entity. McBrearty discloses allowing I/O operations, including both reads and writes, to be performed either on a backup copy, or on one of a series of mirrored volumes, depending on an entry point chosen by a user. McBrearty specifically teaches that read and/or write operations may be performed on each (col. 6, lines 1-67 and col. 7, lines 1-46). McBrearty does not even disclose moving of read locations and write locations, as the user merely selects an entry point into a logical volume and the data is written to or read from a particular mirror based on that selection.

As McBrearty does not even disclose moving of read and write locations at all, it is clear that the system of McBrearty does not necessarily employ separate moving of read and write locations. Thus, McBrearty clearly does not inherently disclose this feature of claim 20.

2. Any Reliance In The Office Action On Purportedly Well-Known Art Is Traversed

McBrearty does not by itself disclose controlling separate moving of a read location and write location, as the determination of which mirror an access request is directed to is based upon the entry point selected by the user.

Applicant respectfully traverses any assertion that well-known art exists that would have motivated one skilled in the art to modify McBrearty to arrive at the invention recited in claim 20. There is simply no teaching or suggestion of record of separately moving read and write locations. If the rejection of claim 20 as being obvious over McBrearty is to be maintained, the Examiner is respectfully requested to cite a reference in support of this position, as required under MPEP § 2144.03. Alternatively, if facts within the Examiner's personal knowledge are being relied upon, the Examiner is respectfully requested to file an affidavit establishing those facts pursuant to MPEP § 2144.03.

As stated in that MPEP section, facts that are purportedly common knowledge or "well-known" should only be relied upon to "fill the gaps" in the prior art and should not comprise the principle evidence upon which a rejection is based. Here, the Examiner's entire basis for modifying McBrearty to include an entity movement manager to control separate moving of a read location and a write location for a specified logical entity is without support in the prior art of record, which is respectfully believed to render the rejection improper under MPEP § 2144.03.

3. Conclusion Regarding Claim 20

For the foregoing reasons, claim 20 patentably distinguishes over McBrearty and is in condition for allowance. Therefore, the rejection of claim 20 under 35 U.S.C. § 103(a) as being obvious over McBrearty should be withdrawn. Claims 21 and 22 depend from claim 20 and are patentable for at least the same reasons.

Claim 21

With respect to claim 21, which depends from claim 20, the Office Action asserts at page 4, paragraph 9 that "one of ordinary skill in the art would readily recognize that it would not be out of the scope of the McBrearty system to store logical entity IDs in a separate database." To the extent Applicant understands the foregoing quote from the Office Action, Applicant

respectfully asserts that the rejection is improper. The feature recited in claim 21 is not inherently disclosed in McBrearty. Applicant respectfully traverses any assertion that well-known art exists that would have motivated one of skill in the art to modify McBrearty to arrive at Applicant's invention, as recited in claim 21. If the rejection of claim 21 as being obvious over McBrearty is to be maintained, the Examiner is respectfully requested to cite a reference in support of this position, as required under MPEP § 2144.03. Alternatively, if facts within the Examiner's personal knowledge are being relied upon, the Examiner is respectfully requested to file an affidavit establishing those facts pursuant to § 2144.03.

Claims 23-30

Claim 23 is directed to a computer system, comprising: a plurality of host computers; a plurality of storage elements; and means for separately moving reads for a logical entity and writes for the logical entity from a first physical storage location on one of the storage elements to a second physical storage location on a different one of the storage elements.

As should be clear from the discussion above, the limitation of claim 23 that recites "means for separately moving reads for a logical entity and writes for the logical entity from a first physical storage location on one of the storage elements to a second physical storage location on a different one of the storage elements" is not disclosed explicitly or inherently by McBrearty.

Further, any reliance on purportedly well-known art in the rejection of claim 23 is traversed. Applicant respectfully traverses any assertion that well-known art exists that would have motivated one of skill in the art to modify McBrearty to arrive at Applicant's invention, as recited in claim 23. If the rejection of claim 23 as being obvious over McBrearty is to be maintained, the Examiner is respectfully requested to cite a reference to support the alleged motivation for modifying McBrearty, as required under MPEP § 2144.03. Alternatively, if facts within the Examiner's personal knowledge are being relied upon, the Examiner is respectfully requested to file an affidavit establishing those facts pursuant to § 2144.03.

Claim 23 patentably distinguishes over McBrearty and is believed to be in condition for allowance. Therefore, the rejection of claim 23 under 35 U.S.C. § 103(a) as being obvious over

McBrearty should be withdrawn. Claims 24-30 depend from claim 23 and are patentable for at least the same reasons.

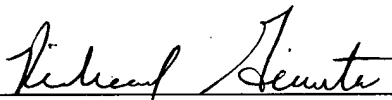
With respect to claims 27 and 28, the Office Action asserts at page 4, paragraph 7 that “McBrearty does not expressly teach wherein the logical could be a hyper-volume or striped volume. However, such volume methods are well known in the art, thereby making use of these methods obvious.” Applicant respectfully traverses any assertion that well-known art exists that would have motivated one of skill in the art to modify McBrearty to arrive at Applicant’s invention, as recited in claims 27 and 28. If the rejection of claims 27 and 28 as being obvious over McBrearty is to be maintained, the Examiner is respectfully requested to cite a reference in support of this position, as required under MPEP § 2144.03. Alternatively, if facts within the Examiner’s personal knowledge are being relied upon, the Examiner is respectfully requested to file an affidavit establishing those facts pursuant to § 2144.03.

CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below to discuss any outstanding issues relating to the allowability of the application.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,
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